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NORTH AMERICAN DRÄGER

Setup and Installation Manual

Vitalert 3000 Series Monitoring Systems

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VITALERT 3000 SERIES
SETUP AND INSTALLATION

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Section 1
Introduction

Introduction

This manual provides the basic information needed to setup and install a Vitalert 3000 Series monitor. The setup must be performed by or under the direct supervision of an authorized North American Dräger representative. The instructions are divided into the following sections:

Section 2 contains an equipment and accessory checklist, followed by complete procedures for installing the monitor, connecting it to anesthesia machines and other equipment, and connecting external sensors.

Section 3 contains cleaning and replacement procedures and instructions on use of the Vitalert 3000 Series maintenance screen.

Section 4 contains repacking instructions.

Warnings, Cautions, and Notes

All parts of this manual contain warning and caution statements about the Vitalert 3000 Series monitor.

- *Warning* statements are used in this manual with procedures that, if not performed correctly, could result in personal injury.
- *Caution* statements are used in this manual to alert service personnel to the possibility of equipment damage if a procedure is not performed correctly.
- *Note* statements are used in this manual to clarify information that may not be readily obvious, such as secondary cause and effect.

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Section 2
Setup and Installation

Overview

This section contains an equipment checklist along with all the steps necessary for the installation and connection of the Vitalert 3000 Series monitor and external sensors.

Equipment/ Accessory Checklist

Remove the Vitalert 3000 Series monitoring system and accessories from the container. Use the checklist below to make sure the following articles were included in the container:

- ☐ 1 Vitalert 3000, 3100, 3200, or 3300 monitor
- ☐ 1 Power cable
- ☐ 1 Data cable (DB9/DB9)
- ☐ 1 Vitalert 3000 Series Operator's Manual

Respiratory Accessories:
- ☐ 1 Gas sample line
- ☐ 1 Adapter/filter
- ☐ 1 Water trap reservoir
- ☐ 1 Six-foot exhaust hose
- ☐ 1 Scavenger adapter assembly
- ☐ 2 Air filters

Pulse Oximetry Accessories (models 3000, 3200)
- ☐ 1 Patient cable with pre-amp
- ☐ 1 Finger probe

Noninvasive Blood Pressure Accessories (models 3100, 3200)
- ☐ 1 Cuff extension hose
- ☐ 1 Adult cuff

Installing the Vitalert 3000 Series Monitor

Installing the Vitalert 3000 Series requires approximately 13.5 by 17 inches of shelf space. The shelf should be capable of supporting at least 35 pounds.

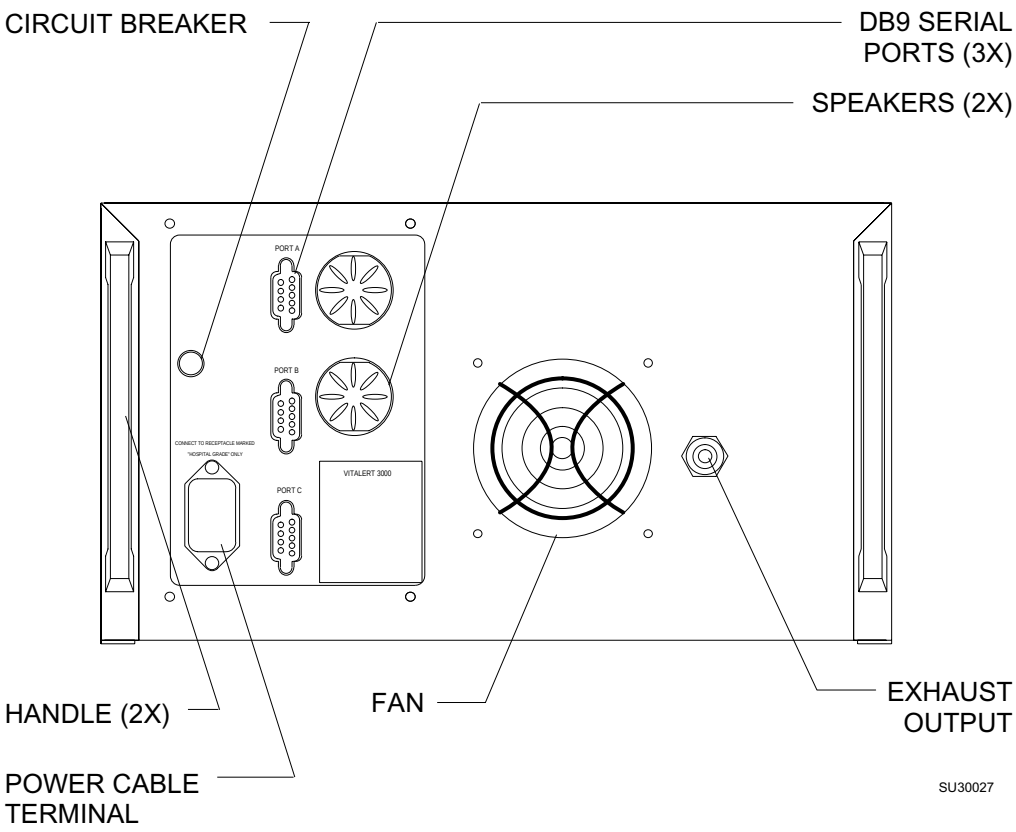
NOTE: The Vitalert 3000 Series monitor is equipped with a universal power supply for 100-240 VAC primary electrical power. The supplied power cord comes with a 117 VAC hospital grade plug. If a different plug is needed, an appropriate connector must be installed on the cord by a qualified electrician.

Attach one end of the power cable to the receptacle on the rear panel. The other end of the Vitalert 3000 Series power cable must be plugged into a grounded outlet.

CAUTION: The Vitalert 3000 Series may have a leakage current of up to 50 µA. When plugged into the convenience receptacle of another device, the monitor may contribute up to 50 µA to the total system chassis leakage current of that device.

Section 2
Setup and Installation

The back panel of the Vitalert 3000 Series is shown in the figure below.



Configuring Default Values

All system settings on the Vitalert 3000 Series, including alarm limits, Datascan settings, units of measure, etc., are initially configured with factory default values. Initial setup of the machine should include configuring all of the system settings and the monitor setup values.

In addition to the template that contains the factory default alarm limit settings, the monitor can store eight additional templates in its memory for later selection. As part of your installation procedure, configure the Standard Site Defaults; these settings become the default alarm limit values upon power-up for all subsequent cases. For complete information on templates, see the *Vitalert 3000 Series Operator's Manual*.

Connecting the Vitalert 3000 Series to a Computer

To interface the Vitalert 3000 Series to a computer (with RS-232 serial Port), contact North American Dräger for technical support.

Connecting the Vitalert 3000 Series to a Vitalert 2000

To connect the Vitalert 3000 Series to a Vitalert 2000:

1. Connect one end of a Vitalink data cable to a serial port on the rear panel of the Vitalert 3000 Series monitor.

2. Connect the other end of the data cable to the serial port on the back of the Vitalert 2000 (see *Vitalert 2000 Operator's Manual*).

3. Secure all connections with the captive screws provided.

4. Configure the Vitalert 3000 Series' serial port, via the Serial Ports System Configuration screen, for the following parameters:

BAUD RATE:	9600
DATA BITS:	8
PARITY:	NONE
STOP BITS:	1
PROTOCOL:	VITALINK

5. Configure the port of the Vitalert 2000 for the same parameters given in step 4 (see *Configuration* section of the *Vitalert 2000 Operator's Manual*). Configure the RTS/CTS as OFF in the communication port configuration screen of the Vitalert 2000.

Connecting the Vitalert 3000 Series to a Narkomed 2C

To connect the Vitalert 3000 Series to a Narkomed 2C anesthesia system:

1. Connect one end of a Vitalink data cable to Port C on the rear of the Vitalert.

2. Connect the other end of the cable to Port A or Port B on the rear of the Narkomed 2C (see the *Narkomed 2C Setup and Installation Manual* and the *Narkomed 2C Operator's Manual*).

3. Secure all connections using the captive screws provided.

4. Configure the Vitalert's Port C, via the Serial Ports System Configuration screen, for the following parameters. To ensure proper communication, the port must be configured exactly as shown below.

BAUD RATE:	9600
DATA BITS:	8
PARITY:	NONE
STOP BITS:	1
PROTOCOL:	VITALINK

5. Configure the port on the Narkomed 2C for the same parameters given in step 4 (see *Invoking the Serial Ports Screen* in the *Narkomed 2C Operator's Manual*).

Connecting the Vitalert 3000 Series to a Narkomed 2B

To connect the Vitalert 3000 Series to a Narkomed 2B anesthesia system:

1. Connect one end of a Vitalink data cable to Port C on the rear of the Vitalert.

2. Connect the other end of the cable to Port A on the rear of the Narkomed 2B (see the *Narkomed 2B Operator's Manual*).

3. Secure all connections using the captive screws provided.

4. Configure the Vitalert's Port C, via the Serial Ports System Configuration screen, for the following parameters. To ensure proper communication, the port must be configured exactly as shown below.

BAUD RATE:	1200
DATA BITS:	8
PARITY:	NONE
STOP BITS:	1
PROTOCOL:	VITALINK

5. Configure Port A of the Narkomed 2B for the same parameters given in step 4 (see the *Configuration* section of the *Narkomed 2B Operator's Manual*).

Connecting the Vitalert 3000 Series to the O.R. Data Manager

To connect the Vitalert 3000 Series to the O.R. Data Manager:

1. Connect one end of a Vitalink data cable to a serial port on the rear of the Vitalert.

2. Connect the other end of the cable to the Vitalink port on the rear of the O.R. Data Manager (see the *O.R. Data Manager Setup and Installation Manual*).

3. Secure all connections using the captive screws provided.

4. Configure the Vitalert's serial port, via the Serial Ports System Configuration screen, for the following parameters.

BAUD RATE:	9600
DATA BITS:	8
PARITY:	NONE
STOP BITS:	1
PROTOCOL:	VITALINK

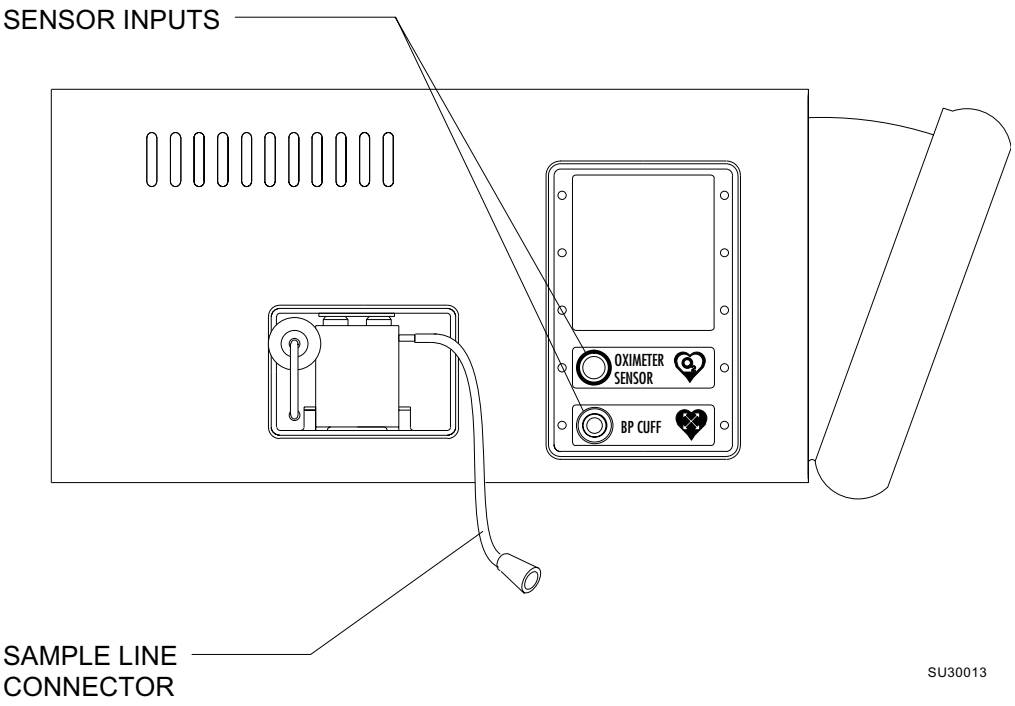
5. Configure the Vitalink port on the O.R. Data Manager for the same parameters given in step 4 (see the *O.R. Data Manager Setup and Installation Manual*).

WARNING: The Vitalert 3000 Series serial communication ports are not compatible with Narkomed 3 serial communication ports. Do not connect these two devices, as this connection could result in the loss of visual and audible alarms.

Connecting the External Sensors

If applicable, connect each of the external sensors to be used in conjunction with the Vitalert 3000, 3100, or 3200 at the interface panel on the left side of the chassis as shown in the figure below. Inputs are provided for the following sensors:

- Pulse Oximeter (models 3000, 3200)
- Blood Pressure Cuff (models 3100, 3200)



Section 2
Setup and Installation

Installing the Oximeter Sensor

The connector end of the patient module cable connects to an interface panel on the left side of the Vitalert 3000 or 3200. The finger sensor connects to the patient module. The cable extension can be installed between the patient module and the finger sensor for additional mobility.

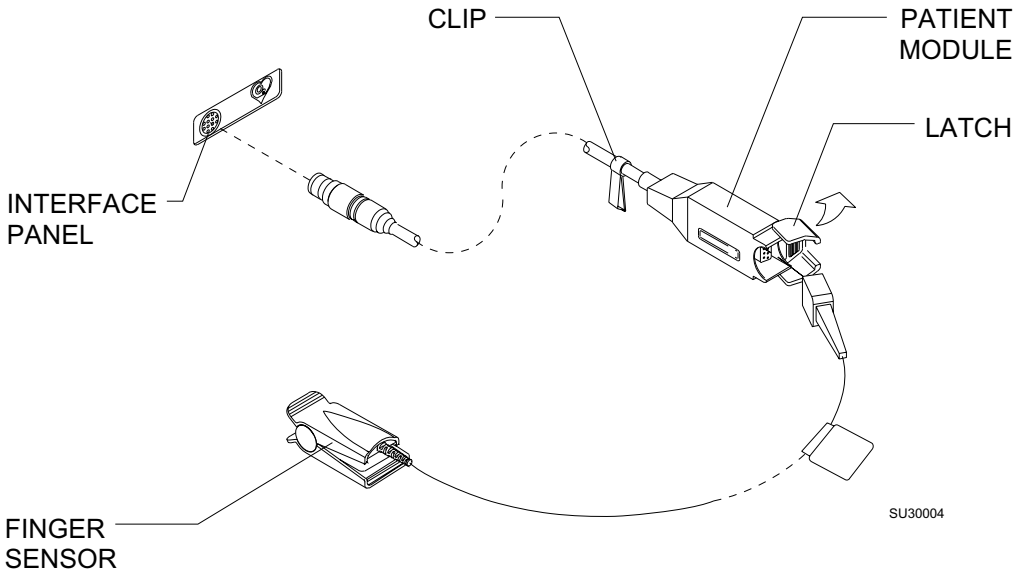
To install the patient module and sensor, follow these steps, using the figure below for reference:

1. Make sure the Vitalert monitor is unplugged.

2. Attach the cable to the interface panel by aligning the red dots and inserting the cable connector into the panel socket.

3. Insert the sensor connector into the patient module socket and latch it into place.

4. Fasten the patient module to a sheet or similar article using the clip attached to the cable.

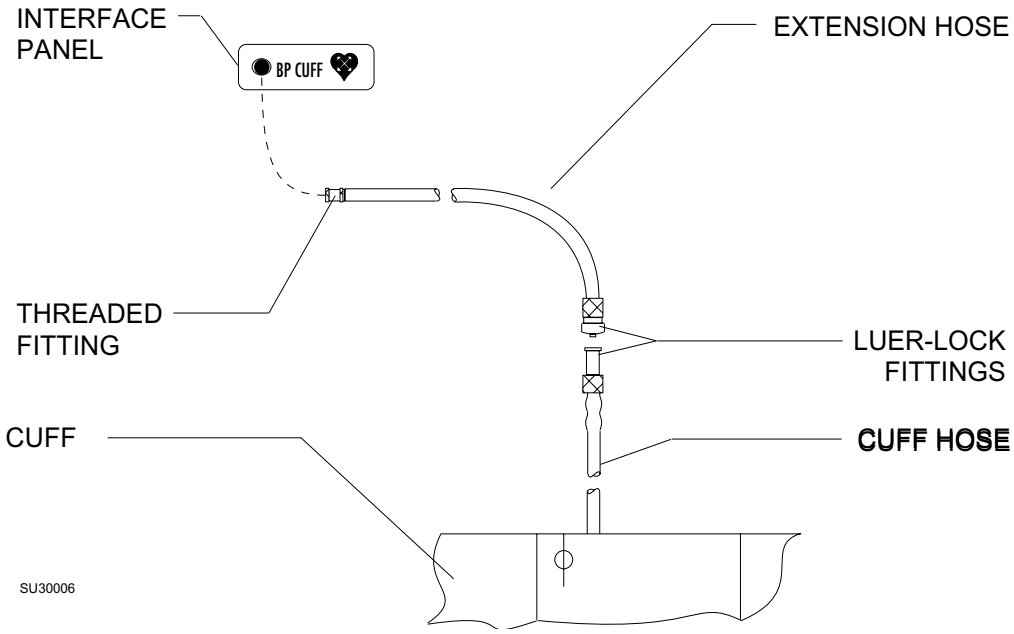


Connecting the Noninvasive Blood Pressure Cuff Hose

To connect the noninvasive blood pressure hose, follow these steps, using the figure below for reference:

1. Connect the cuff hose (attached to the cuff) to the extension hose (with a threaded fitting on one end and a Luer-lock fitting on the other end) by inserting the Luer-lock fitting on the cuff hose into the Luer-lock fitting on the extension hose and twist until they lock together.

2. Attach the other end of the extension hose to the fitting labeled BP CUFF on the Vitalert 3100 or 3200 interface panel. Hand-tighten the threaded hose fitting onto the threaded fitting of the interface panel. Make sure that the hose is not pinched or kinked.



Section 2
Setup and Installation

Installing the Gas Analyzer Sample Line

The illustration shows the components associated with the patient sample line. The following paragraphs describe the installation of each component.

Water Trap Reservoir

Insert the reservoir by guiding its rubber port seals into the mounting bracket's gas flow ports on the left side of the Vitalert 3000 Series monitoring system. Gently push at the reservoir's base until it rests flat against the mounting bracket.

Air Filter

Install the Air Filter onto the fitting located to the left of the water trap reservoir, and connect the PVC sample line to the air filter.

Adapter/Filter

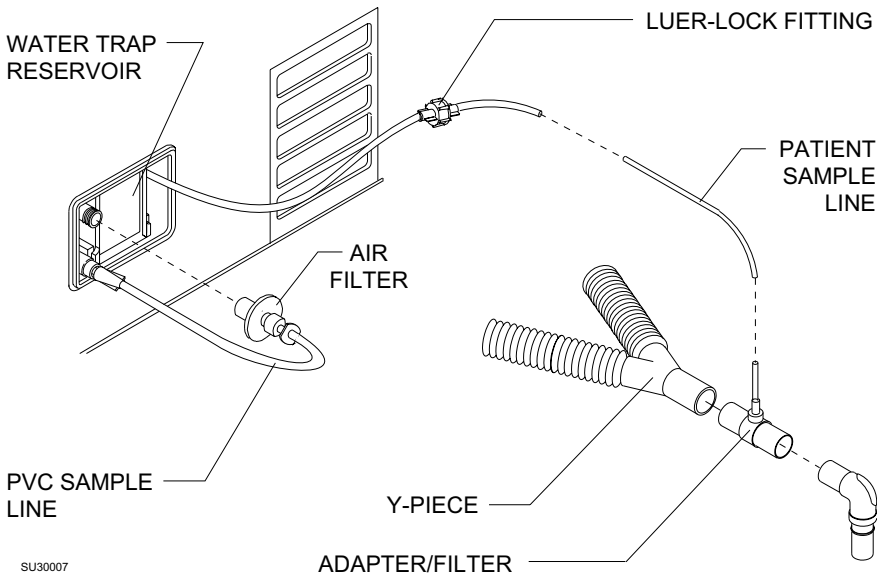
Mount the combination adapter/filter for the sample line between the endotracheal tube (or face mask) and the patient breathing system. This filter is intended to prevent particulate contamination of the sample line.

Patient Sample Line

Install the sample line between the adapter/filter and the water trap reservoir as follows:

1. Insert the male Luer-lock fitting on one end of the line into the female Luer-lock fitting on the adapter/filter. Twist clockwise until secure.

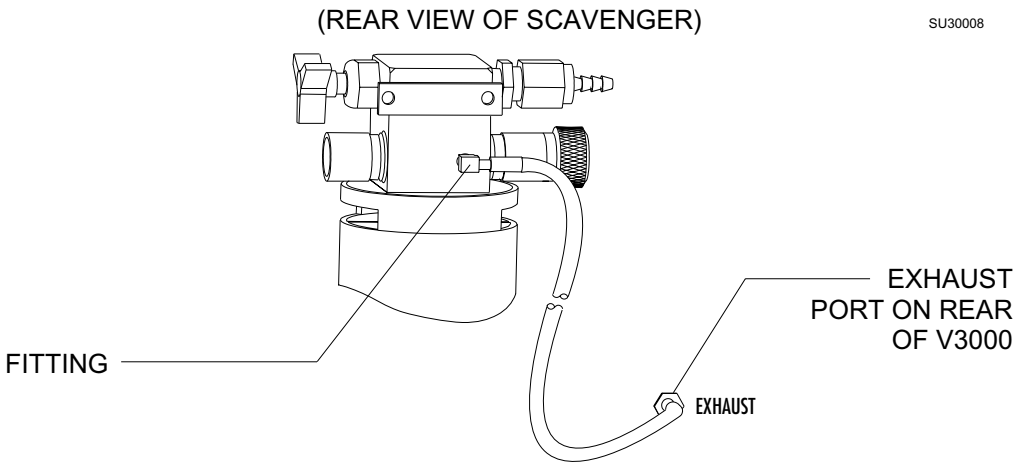
2. Insert the male fitting on the other end of the line into the female fitting attached to water trap reservoir. Twist clockwise until secure. Take care not to kink or pinch the sample line.



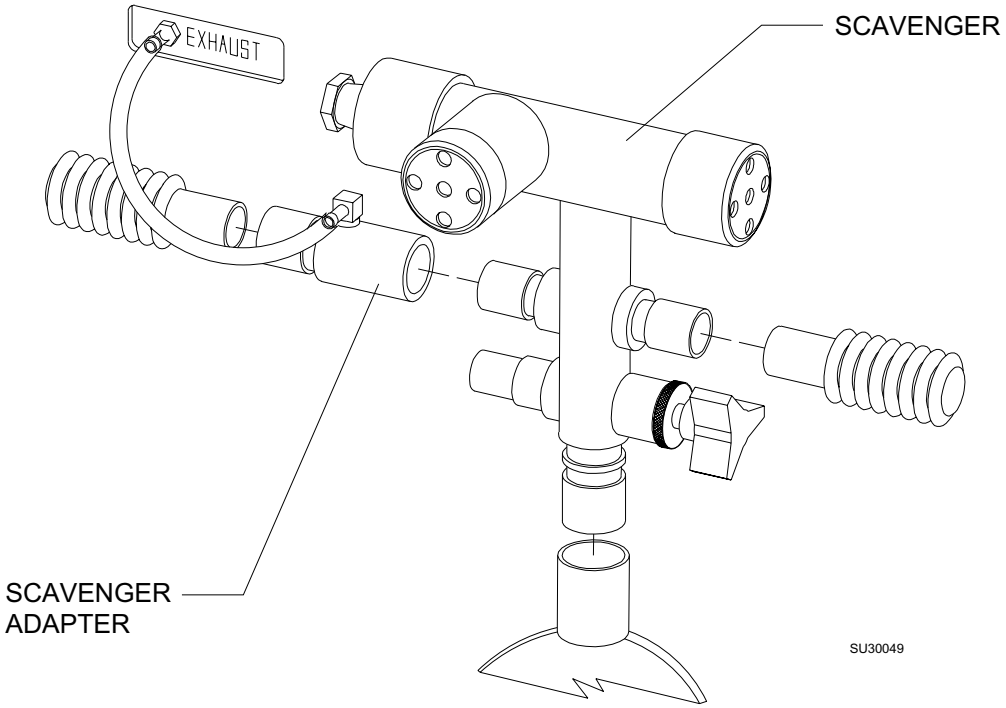
Gas Analyzer Exhaust

Because the monitor withdraws a portion of the patient breathing system gas, sampling gas must be exhausted to the scavenging system.

If you have an open reservoir scavenging system, connect the exhaust line leading from the rear of the monitor to the scavenger as shown in the figure below:



If you have a scavenger interface for passive systems, connect the exhaust line leading from the rear of the monitor to the scavenger using a scavenger adapter, as shown in the figure below:



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Section 3
Routine Maintenance

Overview

This section includes cleaning and replacement procedures and instructions on the use of the Vitalert 3000 Series maintenance screens.

Cleaning and Sterilization

Clean and sterilize the Vitalert 3000 Series monitor and its parts according to the guidelines below. Follow your institution's policies regarding specific methods and agents for cleaning and sterilization. Determination of the need and frequency of sterilization of any particular component is the responsibility of the user institution. Sterilization procedures should be performed according to procedures established by the user institution, following the specific instructions provided by the manufacturer of the sterilizing equipment or agent to be used. Such policies, procedures, and instructions should ultimately be consistent with established principles of clinical microbiology and infection control.

Surfaces

Clean painted, plated, and plastic surfaces of the Vitalert 3000 Series with a soft cloth moistened with an aqueous germicidal cleaner. Mix the germicidal cleanser in accordance with instructions provided by the manufacturer. Do not use solvent cleaners or abrasive cleaning agents on any surfaces of the monitor.

Do not use anesthetic agents for cleaning purposes.

CAUTION: Do not allow liquid to enter the interior of the Vitalert 3000 Series monitor.

Pulse Oximeter Sensor

Do not autoclave the sensor or interface cable. The sensor can be cleaned by wiping the patient contact areas with a liquid disinfection agent or alcohol. Do not use acetone or acetone/alcohol mixtures because they will damage the sensor. Do not immerse the sensor or interface cable. Do not allow liquid to enter the interior of the sensor.

Noninvasive Blood Pressure Cuff

Before cleaning or sterilizing the NIBP cuff, detach it from the extension hose by twisting the Luer-lock fitting at the juncture of the cuff hose and measurement hose. Clean the cuff with a liquid disinfection agent or mild detergent solution.

Do not autoclave the cuff. It can be sterilized with ethylene oxide gas, followed by at least 2 hours aeration in an appropriate aeration cabinet.

Do not autoclave the extension hose. It can be sterilized with ethylene oxide gas (cold cycle), followed by at least 8 hours aeration in an appropriate aeration cabinet.

Section 3
Routine Maintenance

Replacing the Water Trap Reservoir

The disposable water trap reservoir is held by a bracket mounted next to the patient interface panel on the left side of the Vitalert 3000 Series monitor. It is designed to collect excess water accumulation in the sample flow.

To replace a reservoir that is filled to capacity:

1. Detach the full reservoir's flexible hose fitting at the sample line connection by twisting the Luer-lock fitting counterclockwise.

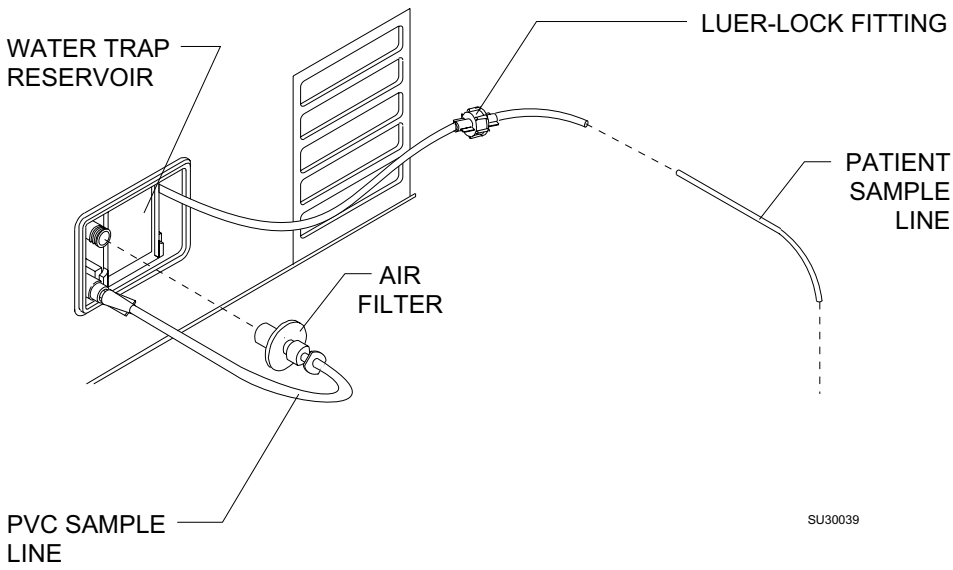
2. To gain access to the reservoir, temporarily remove the air filter by turning it counterclockwise and pulling it from its mounting.

3. Grasp the full reservoir at the base and gently pull away from the mounting bracket, allowing the rubber port seals on top of the reservoir to disengage from the gas flow ports of the mounting bracket. Dispose of the full reservoir properly.

4. Insert the new reservoir by guiding its rubber port seals into the mounting bracket's gas flow ports; gently push at the reservoir's base until it rests flat against the mounting bracket.

5. Connect the new reservoir's flexible hose fitting to the male Luer-lock fitting on the sample line; twist clockwise until secure.

6. Reattach the air filter to the fitting alongside the reservoir. Turn the filter clockwise until secure.



Replacing the Air Filter

The purpose of the air filter is to collect particulate contamination, and it should be replaced if it becomes clogged. Refer to the previous illustration for the location and mounting arrangement of the air filter.

1. Remove the air filter by turning it counterclockwise until it separates from the fitting on the machine.
2. Disconnect the PVC sample line from the filter by holding the filter and turning the Luer-lock fitting on the PVC sample line counterclockwise.
3. Install the replacement air filter on the fitting. Turn the filter clockwise until secure.
4. Reconnect the PVC sample line to the filter. Twist the Luer-lock fitting on the PVC sample line clockwise until secure.

Main Maintenance Screen

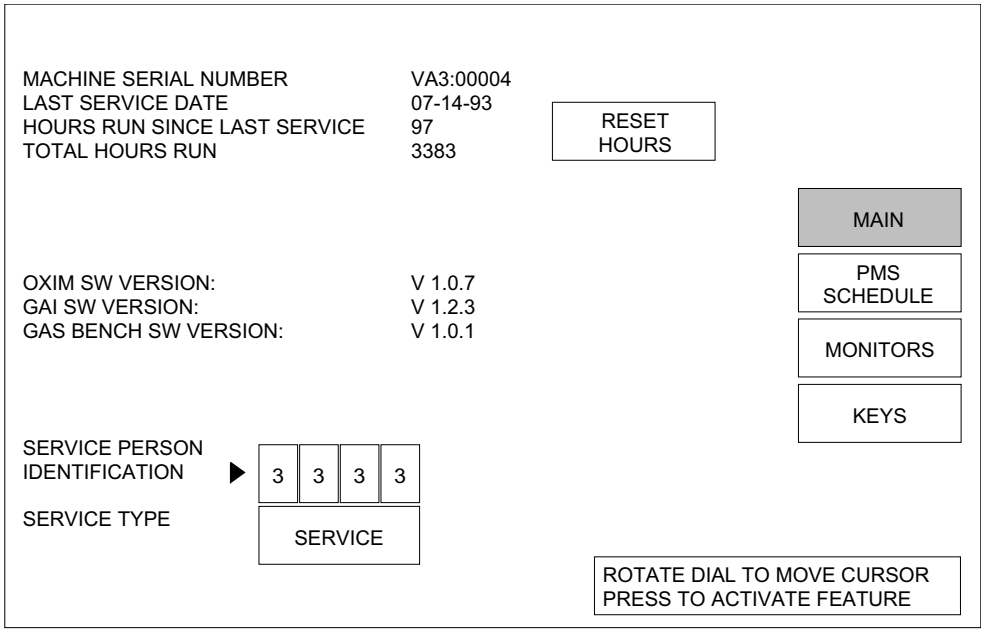
The Vitalert 3000 Series monitors include a maintenance mode that allows the setting of gas sample flow rates, gas analyzer calibration, and diagnostic testing of the NIBP and SpO_2 monitors. These maintenance functions are represented by a series of screens that you can access from the display panel. In addition to these functions a Preventive Maintenance Schedule (PMS) screen is provided for setting the next PMS due date.

The Main Maintenance Screen is shown in the following figure. This screen displays the machine serial number, the date that the machine was last maintained, the hours since last service, total hours on the machine, and the version number for each software set in the machine.

To access the Main Maintenance Screen:

1. Simultaneously press and hold the MONITOR and SYSTEM CONFIG keys.
2. While holding the keys, press the rotary dial.

Section 3
Routine Maintenance



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Accessing the Maintenance Screens

Specific maintenance screens are accessed through the Main Maintenance Screen as follows:

1. Use the rotary dial to position the cursor on PMS or MONITORS.
2. Press the dial to enter the selection.

NOTE: The monitor must be cycled through the Standby mode at the completion of a maintenance session.

PMS Screen

To enter the PMS Screen from the Main Maintenance Screen:

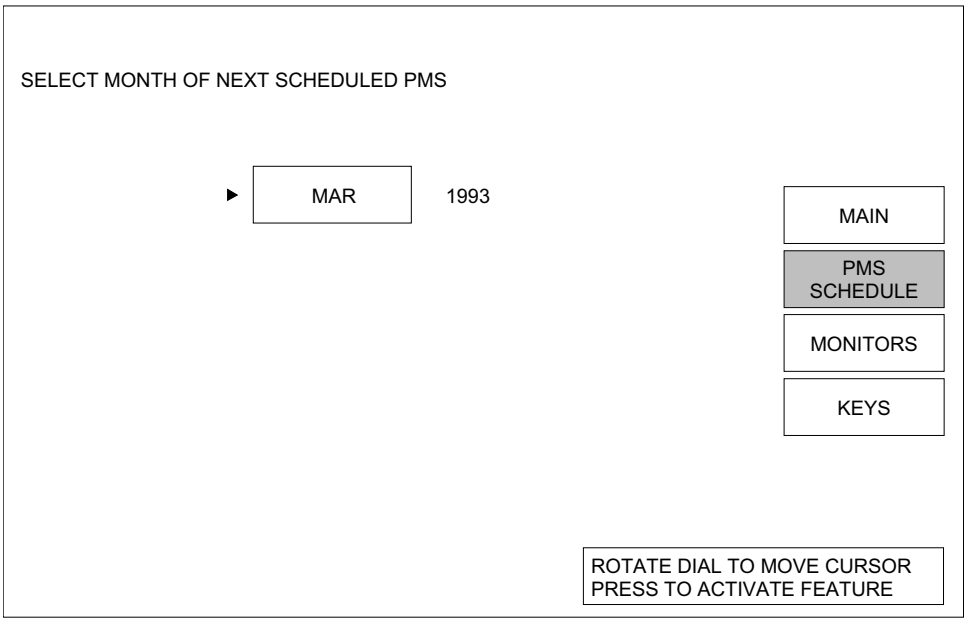
1. Use the rotary dial to position the cursor on the PMS SCHEDULE selection and press the rotary dial. The cursor will appear at the Month function as shown in the figure below.

2. Press the dial to highlight the function.

3. Rotate the dial to select the desired month for the next PMS reminder.

4. Press the dial to save the setting.

The recommended PMS interval for the Vitalert 3000 Series monitors is three months. If the current date exceeds that which has been selected and entered, a Preventive Maintenance Due message will appear on the power-on diagnostics screen.



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Routine Maintenance

Following PMS month selection:

1. Use the rotary dial to position the cursor on MONITORS to proceed with the other maintenance screens. (Selecting MAIN will return you to the Main Maintenance Screen.)

2. Press the dial to return to the selected screen.

SpO_2 Maintenance Screen

To enter the SpO_2 Maintenance Screen:

1. Use the rotary dial to position the cursor on the SPO2 selection.

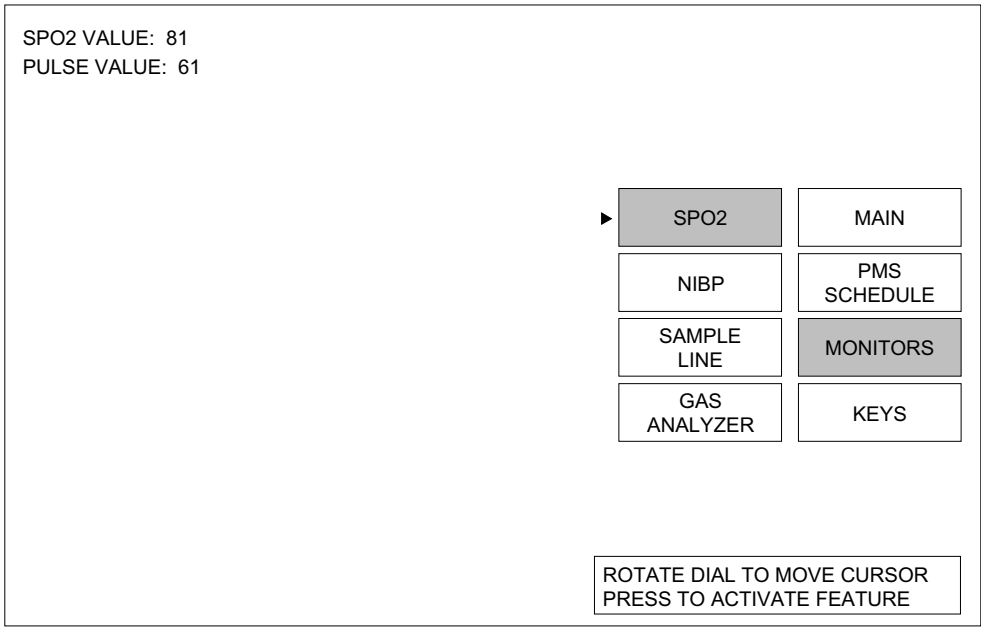
2. Press the rotary dial. A typical screen is shown in the figure below.

This screen displays current values for SpO_2 and Pulse to verify that the pulse oximeter is operational. A calibration check can be made by disconnecting the SpO_2 sensor prior to power up, and connecting a Nellcor® model PT-2500 Pocket Tester. The screen should then display an SpO_2 value of 81 ± 1, and a Pulse value of 61 ± 1.

To return to the main maintenance screen or select another maintenance screen:

1. Use the rotary dial to position the cursor on the MAIN or another maintenance selection.

2. Press the dial to enter the selected screen.



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NIBP Maintenance Screen

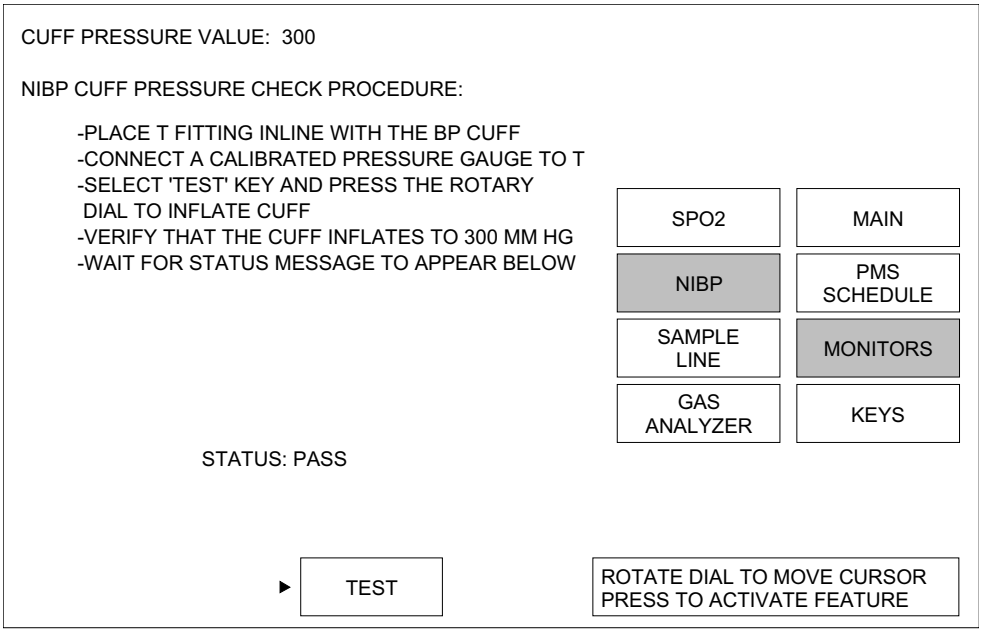
To enter the NIBP Maintenance Screen:

1. Use the rotary dial to position the cursor on the NIBP selection.
2. Press the rotary dial.

This screen indicates the cuff inflation pressure and also provides a timing period after inflation for leak testing. On-screen instructions provide a method of checking pressure calibration with an external gauge. Refer to the figure below.

1. Connect a BP cuff to the interface panel as instructed on the screen.
2. Wrap the cuff loosely around a cylindrical object.
3. Use the rotary dial to position the cursor to TEST.
4. Press the dial to begin cuff inflation.
5. Wait one minute, then compare gauge pressure to CUFF PRESSURE VALUE. The readings should agree within ± 5 mm Hg.

The Cuff Pressure Value will be displayed until the cuff deflates (approximately four minutes after the start of inflation). The STATUS line will then display the result of the test.



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To return to the main maintenance screen or select another maintenance screen:

1. Use the rotary dial to position the cursor on the MAIN or another maintenance selection.

2. Press the dial to enter the selected screen.

Sample Line Flow Maintenance Screen

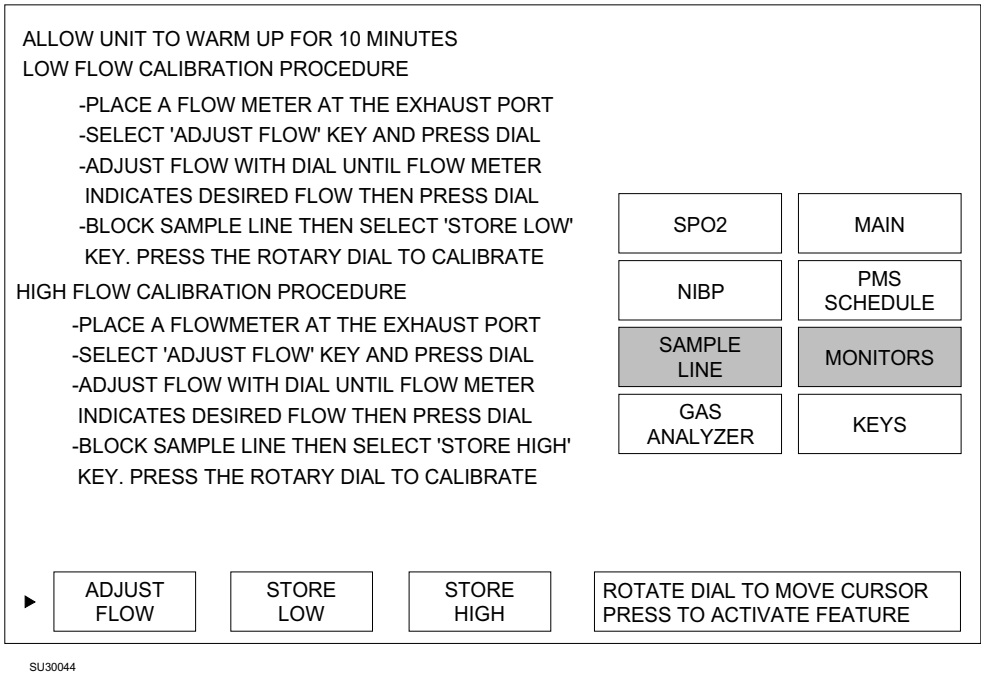
To enter the Sample Line Flow Maintenance Screen:

1. Use the rotary dial to position the cursor on the SAMPLE LINE selection. Refer to the figure below.

2. Press the rotary dial.

This screen allows the gas sample flow rates to be set using an external flow meter (NAD P/N S000081) connected to the exhaust port on the rear panel. Perform the following steps along with the on-screen instructions.

NOTE: Ensure that the disposable reservoir and sample line are clear of any fluid or obstructions. Replace them if necessary. A 96-inch sample line (NAD P/N 4108103) must be attached when performing the sample line flow calibration.


ALLOW UNIT TO WARM UP FOR 10 MINUTES
LOW FLOW CALIBRATION PROCEDURE
-PLACE A FLOW METER AT THE EXHAUST PORT
-SELECT 'ADJUST FLOW' KEY AND PRESS DIAL
-ADJUST FLOW WITH DIAL UNTIL FLOW METER INDICATES DESIRED FLOW THEN PRESS DIAL
-BLOCK SAMPLE LINE THEN SELECT 'STORE LOW' KEY. PRESS THE ROTARY DIAL TO CALIBRATE
HIGH FLOW CALIBRATION PROCEDURE
-PLACE A FLOWMETER AT THE EXHAUST PORT
-SELECT 'ADJUST FLOW' KEY AND PRESS DIAL
-ADJUST FLOW WITH DIAL UNTIL FLOW METER INDICATES DESIRED FLOW THEN PRESS DIAL
-BLOCK SAMPLE LINE THEN SELECT 'STORE HIGH' KEY. PRESS THE ROTARY DIAL TO CALIBRATE
SPO2
MAIN
NIBP
PMS SCHEDULE
SAMPLE LINE
MONITORS
GAS ANALYZER
KEYS
ADJUST FLOW
STORE LOW
STORE HIGH
ROTATE DIAL TO MOVE CURSOR
PRESS TO ACTIVATE FEATURE

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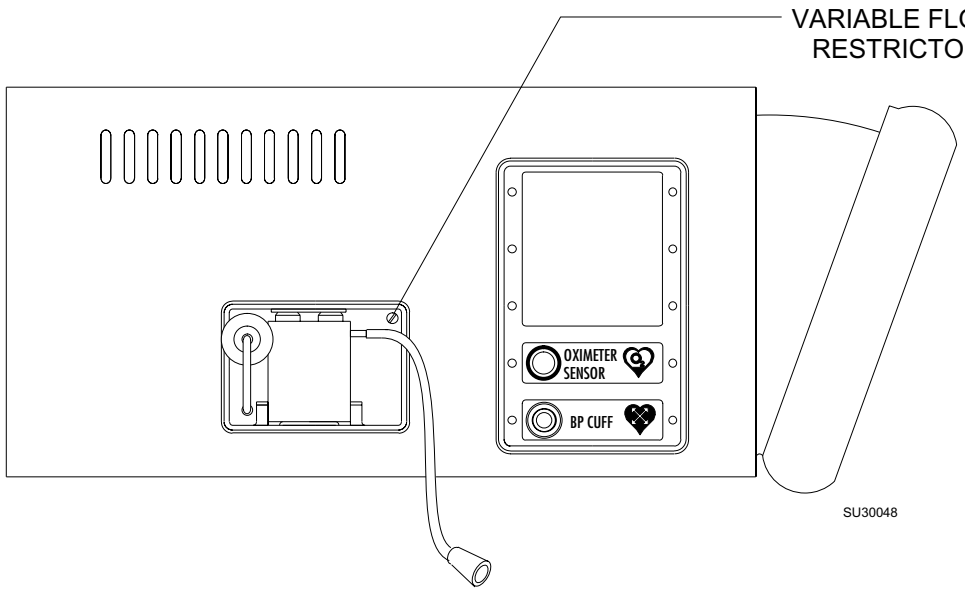
Maximum Flow Adjustment (not on all models or earlier versions)

Maximum flow adjustment procedure:

1. Use the rotary dial to position the cursor on the ADJUST FLOW selection.
2. Press the rotary dial.
3. Rotate the dial until the flow meter connected to the exhaust port reaches a maximum flow "plateau".
4. Adjust the variable flow restrictor next to the water trap reservoir until the flow meter indicates 220 ml/min. Turn the screw to the left to increase the flow or to the right to decrease it.
5. Press the rotary dial.
6. Proceed with the flow calibrations.



Section 3
Routine Maintenance

Low Flow Calibration

Low flow calibration procedure:

1. Use the rotary dial to position the cursor on the ADJUST FLOW selection.
2. Press the rotary dial.
3. Rotate the dial until the flow meter connected to the exhaust port indicates 100 ml/min.
4. Press the rotary dial.
5. Use the rotary dial to position the cursor on the STORE LOW selection.
6. Block sample line for a full 5 seconds.
7. Press the rotary dial. Ensure that the sample line remains blocked until STORE LOW is no longer highlighted.

High Flow Calibration

High flow calibration procedure:

1. Use the rotary dial to position the cursor on the ADJUST FLOW selection.
2. Press the rotary dial.
3. Rotate the dial until the flow meter connected to the exhaust port indicates 190 ml/min. Then slowly turn the dial clockwise until the flow meter indicates 200 ml/min.
4. Press the rotary dial.
5. Use the rotary dial to position the cursor on the STORE HIGH selection.
6. Block sample line for a full 5 seconds.
7. Press the rotary dial. Ensure that the sample line remains blocked until STORE HIGH is no longer highlighted.

Verify Calibration

Verify sample line flow calibrations:

1. Press the ON/STBY key on the main key panel to place the monitor to standby.
2. Press the ON/STBY key a second time to restart the monitor.

3. At the completion of the self-test, press the MONITOR SETUP key on the main key panel.

4. Use the rotary dial to position the cursor on the SAMP FLOW selection on the display.

5. Press the rotary dial. The flow rate bar graph is highlighted.
6. Rotate the dial until the flow rate is at its lowest setting (bar graph completely empty). Flow meter should read 100 ml/min ±25.

7. Rotate the dial until the flow rate is at its highest setting (bar graph completely filled). Flow meter should read 200 ml/min ±25.

8. Press the MONITOR key on the main key panel.

9. Occlude the sample line. A Line Block advisory message should appear within 15 seconds. If the advisory does not appear repeat the calibration procedures or contact North American Dräger Technical Service Department.

10. Release sample line occlusion. The Line Block advisory should disappear within 5 seconds.

Gas Analyzer Accuracy Test

Perform the following accuracy test to determine whether a Span Calibration is needed:

NOTE: Before performing an Accuracy Test or Span Cal, ensure that the CO2 UNITS is set to % and that the monitor has been powered for at least 15 minutes. Refer to the *Monitor Setup Screen* section of the *Vitalert 3000 Series Operator's Manual*.

Accuracy Test:

1. Press the MONITOR SETUP key on the main key panel.

2. Use the rotary dial to position the cursor on the CO2/AGT selection on the display. A box appears around the CAL selection.

3. Press the rotary dial to highlight the box and begin calibration. When the calibration is complete, the box is no longer highlighted.

4. When the calibration is complete, press the MONITOR key on the main control panel to return to the Monitor Screen.

5. Attach the CO_2 cylinder adapter (NAD P/N 4110216) to the CO_2 verification gas cylinder (NAD P/N 4107979).

6. Slightly open the flow control valve on the CO_2 cylinder adapter by turning it counterclockwise.

7. Wait for one full screen waveform sweep, then close the cylinder valve and remove the sample line from the adapter.

8. Verify that the CO_2 display indicates a value between 4.8% and 5.2%. If the reading is not within the specified range, the following Span calibration procedure must be performed.

NOTE: Although a Span calibration may not need to be performed quarterly, the unit must be calibrated annually regardless of accuracy test results.

Gas Analyzer Maintenance Screen

Span calibration procedures:

To enter the Gas Analyzer Maintenance Screen:

1. Press the MONITOR SETUP key, and adjust the sample flow to maximum.

2. Measure the flow rate at the exhaust port on the rear of the monitor.

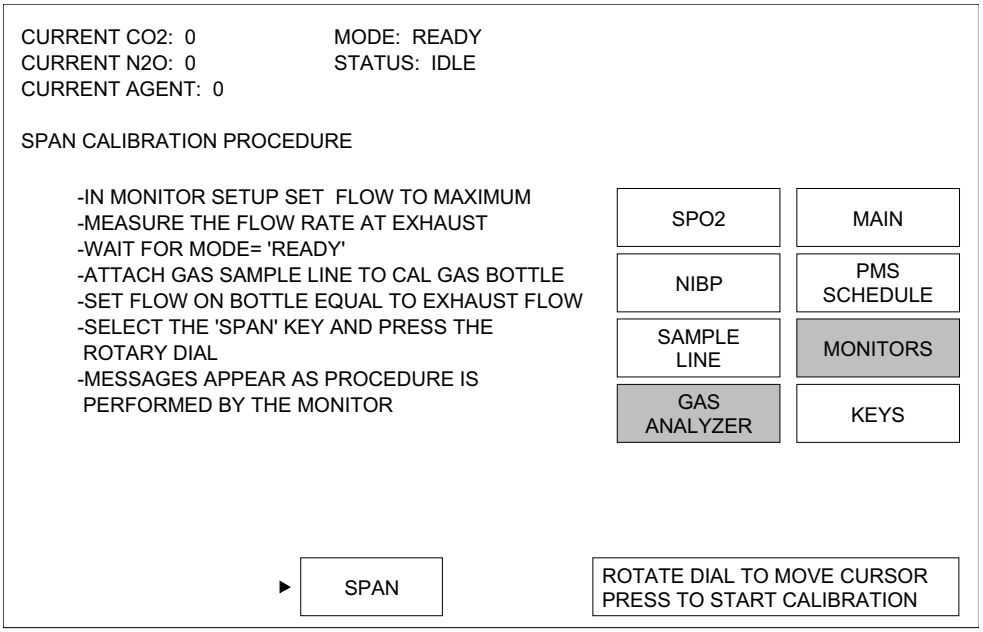
3. Return to the Main Maintenance Screen by simultaneously pressing and holding the MONITOR and SYSTEM CONFIG keys, and press the rotary dial.

4. Use the rotary dial to position the cursor on MONITORS.

5. Press the rotary dial.

6. Use the rotary dial to position the cursor on the GAS ANALYZER selection. Refer to the figure below.

7. Press the rotary dial.



SU30045

This screen allows the operator to make an automatic zero and span calibration using a certified gas sample of known accuracy. Before calibration is attempted, the monitor must have been powered for at least 30 minutes and the MODE: READY message must appear on the screen.

8. Attach a calibration adapter (NAD P/N 4110716) to the calibration gas cylinder (NAD P/N 4110599). (Calibration kit including cylinder and adapter is NAD P/N 4110683).

9. Connect the the gas sample line to the Luer fitting on the calibration gas adapter.

10. Adjust the flow from the calibration gas adapter equal to the previously measured exhaust flow.

11. Use the rotary dial to position the cursor on the SPAN selection.

12. Press the rotary dial.

An automatic Zero calibration will be performed, followed by a STATUS: ZERO PASS message. The automatic Span calibration will then be performed, followed by a STATUS: SPAN PASS message. During the calibration procedure a MODE: NOT READY message will be displayed.

Following the completion of the span calibration, the Vitalert 3000 Series monitor shall be cycled through STBY.

The Gas Analyzer Accuracy Test, outlined earlier in this section, should be performed to verify acceptance of the span calibration.

To return to the main maintenance screen or select another maintenance screen:

1. Use the rotary dial to position the cursor on the MAIN or another maintenance selection.

2. Press the dial to enter the selected screen.

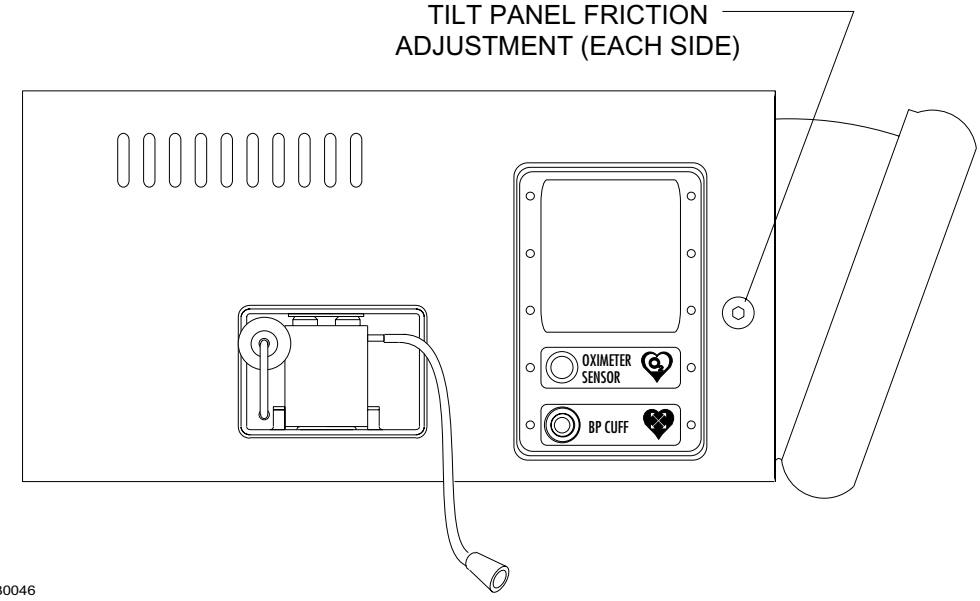
Tilt Bezel Friction Adjustment

The front bezel should be able to stay in any position within the tilt range. If a friction adjustment needs to be made, proceed as follows:

1. Turn the friction adjustment hex head socket screws, located on both sides of the bezel, using a 1/8" hex wrench or driver. Refer to the figure below. Clockwise rotation tightens the bezel; counterclockwise rotation loosens the bezel.

2. Check the feel of the bezel, and readjust the screws if necessary.

NOTE: Make adjustments in small increments to avoid over-tightening and damaging the bezel.



Completion of Routine Maintenance Checklist

Follow the precedures below to complete the Routine Maintenance Checklist provided at the end of this section.

NOTE: Steps marked with an asterisk (*) require a response on the checklist.

1.0 SpO_2/Pulse Routine Maintenance

1.1 Plug the SpO_2 sensor pre-amp cable into the machine interface, and attach a pocket simulator Model 2500 to the pre-amp.

1.2 Power on the Vitalert 3000 Series monitor.

*1.3 After the power-on self-tests, the monitor should display a value between 80 and 82 for oxygen saturation, and a value between 60 and 62 for pulse rate.

1.4 Disconnect the pocket simulator and connect the finger sensor.

*1.5 Attach the sensor to the operator's finger, and obtain pulse and oxygen saturation readings. Verify that a stable reading is obtained for both SpO_2 and pulse.

1.6 Disconnect the sensor from the finger.

*1.7 After ten seconds, the Warning message NO OXI PULSE should appear on the central alarm display.

1.8 Re-connect the sensor to the finger.

1.9 Enter the Alarms Limits Screen. Ensure that the alarms are set to ON.

*1.10 Raise the low pulse alarm limit above the actual rate. (Note: you may need to adjust the high pulse alarm limit to allow the low pulse to break the threshold). The Warning message OXI PULSE LOW should appear on the central alarm display.

1.11 Adjust the low pulse alarm limit to 60.

1.12 Decrease the high pulse alarm limit below the actual pulse rate.

*1.13 The Caution message OXI PULSE HIGH should appear on the central alarm display.

1.14 Adjust the high pulse alarm limit to 100.

1.15 Raise the low SpO_2 alarm limit above the actual rate.

*1.16 The Warning message SPO2 LOW should appear on the central alarm display.

1.17 Adjust the low SpO_2 alarm limit to 90.

1.18 Decrease the high SpO_2 alarm limit below the actual SpO_2 rate.

*1.19 The Caution message SPO2 HIGH should appear on the central alarm display. Adjust the SpO_2 high alarm limit to 100.

1.20 Enter the Alarm Limits Screen and set the SpO_2 alarms to OFF.

2.0 NIBP Routine Maintenance

2.1 Disconnect the NIBP patient cuff from the hose assembly.

2.2 Press the NIBP START key.

*2.3 When the NIBP pump stops, verify that the Advisory message BP CUFF LEAK appears on the central alarm display.

2.4 Perform the NIBP Cuff Pressure Check Procedure (see *NIBP Maintenance Screen* earlier in this section).

*2.5 Verify the NIBP test status: PASS.

*2.6 Verify NIBP accuracy by comparing gauge pressure to the CUFF PRESSURE VALUE displayed on the screen. The readings should agree within ± 5 mmHg.

2.7 Return to the Alarm Limits Screen.

2.8 Reconnect the patient cuff and obtain a reading.

2.9 Lower the systolic high alarm limit below the actual systolic value.

*2.10 The Caution message NIBP SYSTOLIC HI should appear on the central alarm display.

2.11 Adjust the systolic high alarm to 150.

2.12 Raise the systolic low alarm limit above the actual systolic value. (Note: you may need to adjust the systolic high alarm limit to allow systolic low value to break the threshold).

*2.13 The Caution message NIBP SYSTOLIC LO should appear on the central alarm display.

2.14 Press the NIBP STAT key.

*2.15 Measure the time from the end of the first Stat inflation to the start of the next Stat inflation. The elapsed time should be between 2 and 4 seconds.

2.16 Press the NIBP STOP key.

3.0 CO2/Sample Line Routine Maintenance

3.1 Perform sample flow rate verification (see *Verify Calibration* earlier in this section).

*3.1.1 With the flow rate at its lowest setting, verify that the low flow reading is 100 ml/min ±25 ml.

*3.1.2 With the flow rate at its highest setting, verify that the high flow reading is 200 ml/min ±25 ml.

*3.1.3 With the sample line occluded, verify that the Advisory LINE BLOCK appears on the central alarm display.

NOTE: When the sample line is fully occluded, flow should drop to 0 on the flowmeter. If it does not, there may be a partial leak in the system. Check all external connections.

*3.2 Perform the Gas Analyzer Accuracy Test as outlined earlier in this section.

3.3 Enter the Alarm Limits Screen.

3.4 Set the CO_2 alarms to ON.

3.5 Breathe into the sample line to obtain a CO_2 reading.

3.6 Raise the CO_2 low alarm limit above the actual CO_2 value.

*3.7 The Caution message ET CO2 LOW should appear on the central alarm display.

3.8 Adjust the CO_2 low alarm limit to 1.3%.

3.9 Breathe into the sample line to obtain a CO_2 reading.

3.10 Lower the CO_2 high alarm limit below the actual CO_2 value.

*3.11 The Caution message ETCO2 HIGH should appear on the central alarm display.

3.12 Adjust the CO_2 high alarm limit to 6.6%.

3.13 Breathe one breath into the sample line. Begin timing when a new CO_2 measurement appears on the screen.

*3.14 The Caution message APNEA-CO2 should appear on the central alarm display within 15 seconds.

*3.15 The APNEA-CO2 message should be upgraded to a Warning on the central alarm display within the next 15-second period (30 seconds total).

3.16 Breathe short, repetitive breaths into the sample line in order to generate an inspired CO_2 >0.7%.

*3.17 Verify that the Advisory message INSP CO2 HIGH appears on the central alarm display when the inspired CO_2 reading exceeds 0.7%. (Note: other advisories may need to be cleared to create space for this advisory).

3.18 Enter the Alarm Limits Screen and set the alarms to OFF.

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Vitalert 3000 Routine Maintenance Checklist

Institution _____ Model No. _____

Address _____ Serial Number _____

City _____ State _____ Zip _____ Room No. _____

- ☐ 1.0 SPO2/PULSE
- ☐ 1.3 VERIFY O2SAT AND PULSE SIMULATOR
- ☐ 1.5 DURASENSOR READINGS
- ☐ 1.7 NO OXI PULSE WARNING
- ☐ 1.10 OXI PULSE LOW WARNING
- ☐ 1.13 OXI PULSE HIGH CAUTION
- ☐ 1.16 SPO2 LOW WARNING
- ☐ 1.19 SPO2 HIGH CAUTION

- ☐ 2.0 NIBP
- ☐ 2.3 BP CUFF LEAK ADVISORY
- ☐ 2.5 NIBP TEST PASSED
- ☐ 2.6 NIBP ACCURACY
- ☐ 2.10 NIBP SYS HI CAUTION
- ☐ 2.13 NIBP SYS LO CAUTION
- ☐ 2.15 STAT INTERVAL

- ☐ 3.0 CO2/SAMPLE FLOW
- ☐ 3.1.1 100 ml/min ± 25
- ☐ 3.1.2 200 ml/min ± 25
- ☐ 3.1.3 LINE BLOCK ADVISORY
- ☐ 3.2 CO2 (4.8% - 5.2%)
- ☐ 3.7 ETCO2 LOW CAUTION
- ☐ 3.11 ETCO2 HIGH CAUTION
- ☐ 3.14 APNEA - CO2 CAUTION
- ☐ 3.15 APNEA - CO2 WARNING
- ☐ 3.17 INSP CO2 HIGH ADVISORY

NOTES: Following completion of all calibrations/verifications, set the cursor to RESET HOURS selection and press rotary dial to reset the Hours Run Since Last Service to zero. After reseting hours to zero Vitalert 3000 shall be cycled through STBY.

Electrical Safety Testing (to include chassis Leakage and Ground Continuity check) shall be performed by qualified personnel on a quarterly basis.

COMMENTS: _____

_____

_____

Signature _____ Date _____

Title/Dept. _____

Telephone ( ) _____ Ext. _____

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Section 4
Return Instructions

Repacking Guidelines

NOTE: After the replacement Vitalert 3000 Series Monitor is shipped, North American Dräger will send a call tag to your facility. This tag is issued for the return shipment of your original Vitalert monitor.

Please have the original unit packaged and ready for return as soon as possible. Call tags are valid for three business days only.

Use the shipping container and packaging materials from the replacement Vilatert monitor to repack your return unit.

Remove and discard the auxiliary water trap before packaging the return Vitalert monitor.

Retain the power cord as well as all connecting cables and hoses unless otherwise directed by the North American Dräger Service Department. These items will not be shipped with the replacement unit.

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NORTH
AMERICAN
DRÄGER

3135 Quarry Road
Telford, PA 18969
(215) 721-5400
(215) 721-9561 (Sales Fax)
(215) 723-5935 (Service Fax)

Part Number: 4112678-005 (Vitalert 3000 Series Setup and Installation Manual)

Rev: -
Date: December 12, 1995
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